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What is claimed is:

1. A method for a mobile terminal in mobile communication systems to transfer non-speech data over voice channel, comprising steps of:

(a) detecting whether the speech burst sent to another mobile terminal is

5   over;

(b) checking whether there is non-speech data to be sent to said another mobile terminal if detecting that the speech burst is over;

(c) sending at least one non-speech data to said another mobile terminal via voice channel if there is non-speech data to be sent.

10   2. The method as claim 1, wherein before step (a), further including steps of:

(i) encapsulating said non-speech data to be sent to said another mobile terminal into IBD (In-Band Data) frames;

(ii) storing the IBD frames in a buffer.

3. The method as claim 2, wherein t he IBD code word for marking said IBD

15   frames is composed of the SID (Silence Description) code word for marking a SID frame, and the value of each bit selected from the bits that form the SID code word, for differentiating the IBD code word from the SID co de word, can't be the same as that of each bit for marking the SID code word.

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4. The method as claim 3, wherein the number of said selected bits is required to ensure that the value of each bit forming said IBD code word will not appear in speech frames.

5. The method as claim 2, wherein the IBD code word for marking said IBD frames is composed of all bits for carrying Block Amplitude parameter and at least one bit selected from the SID code word for marking said a SID frame, and the value of each said bit for carrying Block Amplitude parameter is zero, and the value of each said bit selected from the SID code word can 't be the same as that of each bit for marking the SID code word.

6. The method as claim 2, wherein the IBD code word for marking said IBD frames is composed of the SID code word for marking a SID frame and at least one reserved bit not included in the SID code word.

7. The method as any one of claim 3 to 6, wherein said IBD frames have the same length as said SID frame and the speech frames sen t from the mobile terminal to said another mobile terminal.

8. The method as claim 7, wherein said IBD frames are sent during the time when said SID frame is supposed to be sent in conventional communications if hangover procedure is not enabled.

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9. The method as claim 7, wherein if hangover procedure is enabled, said IBD frames are sent during the time when the silence speech frames are supposed to be sent in conventional communications, wherein said silence speech frames are used to compute said SID frame .

5   10. The method as any one of claim 3 to 5, further comprising steps of:

(d) pausing sending said IBD frames if detecting that a new speech burst is required to transfer to said another mobile terminal while said IBD frames have not all been sent out yet; and

(e) sending the new speech burst to said another mobile terminal.

10   11. The method as any one of claim 3, 4 and 6, wherein the value of the bits for carrying Block Amplitude parameter in said IBD frames is set to zero or nearly zero.

12. The method as claim 1, before executing step (c), further comprising steps of:

15   sending a probing frame to said another mobile terminal to check whether said another mobile terminal supports IBD frames; and

sending IBD frames to said another mobile terminal if receiving the confirmation response from said another mobile terminal.

13. A method for a mobile terminal to transfer non -speech data in voice channel, comprising steps of:

(i) detecting the received frame from another mobile terminal;

(ii) storing, if the received frame is a IBD (In-Band Data) frame, the IBD frame;

(iii) generating background noise by using the previously received SID frame.

14. The method as claim 13, wherein the IBD code word for marking said IBD frames is composed of the SID (Silence Description) code word for marking a SID frame, and the value of each bit selected from the bits that form the SID code word, for differentiating the IBD code word from the SID code word, can't be the same as that of each bit for marking the SID code word.

15. The method as claim 13, wherein the IBD code word for marking said IBD frames is composed of all bits for carrying Block Amplitude parameter and at least one bit selected from the SID code word for marking a SID frame, and the value of each said bit for carrying Block Amplitude parameter is zero, and the value of each said bit selected from the SID code word can 't be the same as that of each bit for marking the SID code word.

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16. The method as claim 13, wherein the IBD code word for marking said

IBD frames is comp osed of the SID code word for marking a SID frame and

at least one reserved bit not included in the SID code word.

17. The method as any one of claim 14 to 16, wherein said IBD frames have

the same length as said SID frame and the speech frames from said a nother

mobile terminal.

18. The method as claim 14, wherein step (i) further includes:

(a1) checking the SID code word of said received frame;

(a2) detecting the value of the remained bits after said bits are selected from

the SID code word to judge whethe r said received frame is an IBD frame, if

the SID code word indicates that said received frame is not a SID frame.

19. The method as claim 15, wherein step (i) further includes:

(a2) checking the SI D code word of said received frame;

(b2) detecting the val ue of all bits for carrying Block Amplitude parameter and

the value of said bits selected from the SID code word, to judge whether said

received frame is an IBD frame, if the SID code word indicates that said

received frame is not a SID frame.

20. The method as claim 16, wherein step (i) further includes:

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(a3) checking the SID code word of said received frame;

(b3) detecting the value of said reserved bits not included in the SID code word, to judge whether said received frame is an IBD frame, if the SID co de word indicates that said received frame is not a speech frame.

21. The method as any one of claim 14 to 16, wherein the value of the bits for carrying Block Amplitude parameter in said IBD frames is set to zero or nearly zero.

22. The method as any one of claim 18 to 20, wherein further comprising steps of:

(c) receiving a probing frame from said another mobile terminal;

(d) returning a confirmation response to said another mobile terminal if the mobile terminal supports IBD frames.

23. A mobile terminal, comprising:

the first detecting unit, for detecting whether a speech burst sent from the mobile terminal to another mobile terminal is over, and checking whether there is non-speech data to be sent to said another mobile terminal when detecting that the speech burst is over;

a sending unit, for sending frames to said another mobile terminal;

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a control unit, for controlling said sending unit to send at least one

non-speech data frame to said another mobile terminal via voice channel

when there is non-speech data to be sent.

24. The mobile terminal in claim 23, further comprising:

an IBD (In-Band Data) frame generating unit, for encapsulating the

non-speech data to be sent to said another mobile terminal into IBD frames;

the first buffer, for storing the gen erated IBD frames.

25. The mobile terminal in claim 24, wherein the IBD code word for marking

said IBD frames is composed of the SID code word for marking a SID frame,

and the value of each bit selected from the bits that form the SID code word,

for differentiating said IBD code word from said SID code word, can 't be the

same as that of each bit for marking the SID code word.

26. The mobile terminal in claim 24, wherein the IBD code word for marking

said IBD frames is composed of all bits for carrying Block Amplitude

parameter and at least one bit selected from the SID code word for marking a

SID frame, and the value of each said bit for carrying Block Amplitude

parameter is zero, and the value of each said bit selected from the SID code

word can't be the same as that of each bit for marking the SID code word.

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27. The mobile terminal in claim 24, wherein the IBD code word for marking said IBD frames is composed of the SID code word for marking a SID frame and at least one reserved bit not included in the SID code word.

28. The mobile terminal in any one of claim 25 to 27, wherein said IBD frames have the same length as said SID frame and the speech frames sent from the mobile terminal to said another mobile terminal.

29. The mobile terminal in claim 28, wherei n if the hangover procedure is not enabled, said sending unit sends said IBD frames during the time when said SID frame is supposed to be sent in conventional communications.

30. The mobile terminal in claim 28, wherein if the hangover procedure is enabled, said sending unit sends said IBD frames during the time when the silence speech frames are supposed to be sent in conventional communications, wherein said silence speech frames are used to compute said SID frame.

31. The mobile terminal in claim 28, further comprising:

the second detecting unit, for detecting a frame received from said another mobile terminal;

the second buffer, for when the received frame is a IBD frame, buffering

the IBD frame;

a Rx comfort noise unit, for generating background noise b y using the previously received SID frames.

32. The mobile terminal in claim 31, wherein said detecting unit further comprising:

an IBD frame identifying unit, for checking the SID code word of said received frame, and detecting the value of the remained b its after said bits are selected from said SID code word to judge whether said received frame is an IBD frame when said SID code word indicates that said received frame is not a SID frame.

33. The mobile terminal in claim 31, wherein said detecting unit fu rther comprising:

an IBD frame identifying unit, for checking the SID code word of said received frame, and detecting the value of all bits for carrying Block Amplitude parameter and the value of said bits selected from said SID code word to judge whether said received-frame is an IBD frame when said SID code word indicates that said received frame is not a SID frame.

34. The mobile terminal in claim 31, wherein said detecting unit further

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comprising:

an IBD frame identifying unit, for checking the SID code word of said

received frame, and checking the value of said reserved bits not included in

said SID code word to judge whether said received frame is an IBD frame

when said SID code word indicates that said received frame is not a speech

frame.